

St. Joseph-Lake Michigan Watershed Restoration Action Strategy

Part II: Concerns and Recommendations

Prepared by
Indiana Department of
Environmental Management
Office of Water Quality

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Foreword

The First Draft (October 1999) of the Watershed Restoration Action Strategy (WRAS) was reviewed internally by IDEM and revised accordingly. The Second Draft (March 2000) was reviewed by stakeholders and revised accordingly. This Third Draft (January 2000) is intended to be a living document to assist restoration and protection efforts of stakeholders in their sub-watersheds. As a "living document" information contained within the WRAS will need to be revised and updated periodically.

The WRAS is divided into two parts: Part I, Characterization and Responsibilities and Part II, Concerns and Recommendations.

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St. Joseph-Lake Michigan Watershed Restoration Action Strategy

Part II: Concerns and Recommendations

Part II of the Watershed Restoration Action Strategy discusses the water quality concerns identified for the St. Joseph-Lake Michigan Watershed and lists recommended management strategies to address these concerns.

Part II includes:

Section 1	Water Quality Concerns and Priority Issues Identified by Stakeholder Groups
Section 2	Water Quality Concerns and Priority Issues Identified by State and Federal Agencies
Section 3	Identification of Impaired Waters
Section 4	Priority Issues and Recommended Management Strategies
Section 5	Future Actions and Expectations

1 Water Quality Concerns and Priority Issues Identified by Stakeholder Groups

The St. Joseph-Lake Michigan watershed contains potential stakeholder groups that have different missions. Many of these groups have a long history of working in the St. Joseph-Lake Michigan watershed. The following discussion briefly describes some of the watershed groups and lists their priorities and concerns.

Elkhart County Soil and Water Conservation District

The Elkhart County Soil and Water Conservation District has developed a Long Range Plan and Annual Work Plan. Listed below are concerns addressed in their plans.

1. Monitor surface water quality
2. Facilitate communication between ag and urban
3. Education and information on septic systems
4. Assist farmers in removing livestock from drainage ways

Kosciusko County Soil and Water Conservation District

The Kosciusko County Soil and Water Conservation District has held locally led meetings to prioritize concerns of the local people related to natural resources. Following are some of the concerns addressed through this process:

1. Loss of land to urban sprawl
2. Threats to right to farm
3. Lack of erosion control
4. Lack of water usage plan

5. Loss of fish and wildlife habitat
6. Disappearing wetlands as they relate to water quality
7. Lack of Stewardship Ethic
8. Lack of manure management

LaGrange County Soil and Water Conservation District

Through public meetings the LaGrange County Soil and Water Conservation District has developed the following list as concerns for their county:

1. Water and wind erosion
2. Erosion on development sites
3. Groundwater contamination from agriculture (chemicals and nutrients)
4. Streambank erosion
5. Animal waste
6. Lack of productive woodlands
7. Eutrophication and sedimentation

Noble County Soil and Water Conservation District

The Noble County Soil and Water Conservation District has held meetings to gather input on local concerns within the county. The results of these meetings provide direction for the District. Thirty concerns were identified. Listed below are the top seven concerns. This winter the District will be hosting a meeting to re-visit these concerns and to identify new concerns with the local citizens.

1. Groundwater Contamination
2. Poor Surface Water Quality
3. Soil Erosion on Agricultural Land
4. Streambank Stabilization
5. Lack of Woodland Management
6. Loss of Woodland
7. Manure Management

St. Joseph County Soil and Water Conservation District

The St. Joseph County Soil and Water Conservation District has conducted locally led meetings to gather the concerns of the local people on issues related to natural resources. Through these meetings the concerns have been prioritized and are listed below.

1. Zoning to protect farmland, highly productive land
2. Water quality, ground and surface water related to septic and wells
3. Urban Growth
4. Education, stewardship in natural resources, soils and drainage, conservation

St. Joseph River Basin Commission

The St. Joseph River Basin Commission (SJRBC) was organized under an act of the 1988 Indiana State Legislature. It consists of seven counties (St. Joseph, Elkhart, Kosciusko, Noble, LaGrange, Steuben, Dekalb) and was formed for the following purposes:

1. Provide a forum for discussion, study, and evaluation of water resources issues of common concern in the Basin
2. Facilitate and foster cooperative planning and coordinated management of the Basin's water and related land resources
3. Develop positions on major water source issues and serve as an advocate of the Basin's interests
4. Make recommendations on matters related to the Commission's functions and objectives, to political subdivisions in the Basin, and to other public and private agencies
5. Develop plans to improve water quality in the Basin

The Steuben County Soil and Water Conservation District

The Steuben County Soil and Water Conservation District has developed, through their Agricultural Needs Assessment Committee, a list of concerns and priorities. The following are the top nine:

1. Lack of filterstrips
2. Need more hay/CRP on sensitive land
3. Old drainage tile over burdened and broken down (installed In 1900's – 1920's)
4. Increased runoff/Erosion due to No-till and conventional till
5. Waste Management and odor (management aspects)
6. Lack of retention ponds and areas
7. Wash outs in ditches due to tile blow outs
8. Too many deer (population)
9. Nutrient, fertilizer, and herbicide management in agricultural setting

Steuben County Water Quality Committee

This committee receives technical and educational support from the Steuben County SWCD, IDNR-Division of Soil Conservation, USDA-Natural Resources Conservation Service, Purdue Cooperative Extension Service, Steuben County Surveyor, and Steuben County Plan Commission.

The mission of the committee is to review, assess, target and monitor watershed land treatment (ag and urban) necessary to achieve water quality and water management in Steuben County.

Friends of the St. Joe River Association Inc.

The Friends of the St. Joe River Association Inc. was established in April 1994 for the purpose of bringing together communities located within the St. Joseph River watershed to work together clean and restore the St. Joe River and its tributaries.

Michigan Department of Natural Resources, Fisheries Division

The Michigan Department of Natural Resources, Fisheries Division has developed an Assessment for the St. Joseph River. It is a comprehensive reference for citizens and agency personnel primarily within the Michigan area section of the watershed; however there has been an effort made to include the entire watershed throughout the assessment.

2 Water Quality Concerns and Priority Issues Identified by State and Federal Agencies

This section presents the combined efforts of state and federal agencies, and universities (such as IDEM, IDNR, USDA-Natural Resources Conservation Service, Ohio River Valley Water Sanitation Commission, Purdue University, Indiana University, Indiana Geologic Survey, and US Geological Survey) to assess water quality concerns and priority issues in the St. Joseph-Lake Michigan Watershed. This multi-organization effort formed the basis of the Unified Watershed Assessment for Indiana. At this time, the Unified Watershed Assessment has been completed for 1998 and 2000-2001, as described below.

Indiana's 1998 Unified Watershed Assessment (UWA)

The UWA workgroup gathered a wide range of water quality data that could be used to characterize Indiana's water resources. These data were used in layers in order to sort the 8-digit HUC watersheds according to the present condition of the water in lakes, rivers, and streams. The workgroup used only those data which concerned the water column, organisms living in the water, or the suitability of the water for supporting aquatic ecosystems. Each layer of information/data was partitioned by percentiles into scores. The scores ranged between one and five, with a score of one indicative of good water quality or minimum impairment, and a score of five indicating heavily impacted or degraded water quality. The scoring derived through the UWA process is presented in Table 2-1.

The data layers listed in Table 2-1 can be defined as:

- ◆ Lake Fishery: Large mouth bass community information for lakes
- ◆ Stream Fishery: Small mouth bass community information for streams
- ◆ Aquatic Life Use Support: The suitability of the water column for aquatic life, determined from evaluation of chemical and physical water data, and assessment of aquatic life
- ◆ Fish Consumption Advisories: Site specific advisories based on current data
- ◆ Fish Index of Biotic Integrity: Based on fish community diversity and fish health

- ◆ Qualitative Habitat Evaluation Index: Measure of whether the aquatic habitat is suitable for diverse communities, based on visual observations
- ◆ Lake Trophic Scores: Indicator for the rate at which a lake is >aging= due to inputs of nutrients and other factors
- ◆ Sediment Potential: Indicator of potential sediment input to waterbodies in the watershed

The sources and additional information for these data layers include:

- ◆ Lake Fishery: From IDNR fisheries surveys of lakes and reservoirs from 1972 to 1994. Raw scores were averaged for all lakes in the watershed
- ◆ Stream Fishery: From IDNR fisheries surveys of streams from 1970 to 1994. Raw scores were averaged for all streams in the watershed
- ◆ Aquatic Life Use Support: IDEM, Office of Water Quality, Assessment Branch
- ◆ Fish Consumption Advisories: ISDH and IDEM, Office of Water Quality, Assessment Branch
- ◆ Fish Index of Biotic Integrity: IDEM, Office of Water Quality, Assessment Branch
- ◆ Qualitative Habitat Evaluation Index: IDEM, Office of Water Quality, Assessment Branch
- ◆ Lake Trophic Scores: Indiana Clean Lakes Program through IDEM, Office of Water Quality, Assessment Branch. This score was based on information gathered from sampling conducted in the 1970's and 1980's
- ◆ Sediment Potential: U.S. Geological Survey scored the population rate of change and the 1996 Conservation Tillage Transect data. The scores were then added and normalized to produce a sediment yield indicator for each watershed

From this scoring, it is evident that lake fishery and sediment potential are the key concerns. The other categories, except stream fishery, are in the moderate to high index indicating there are also significant problems in the St. Joseph-Lake Michigan watershed.

TABLE 2-1
RESULTS OF THE UNIFIED WATERSHED ASSESSMENT
FOR St. Joseph-Lake Michigan

Data/Information Layer	St. Joseph-Lake Michigan (04050001) Score
Lake Fishery	4
Stream Fishery	1
Aquatic Life Use Support	3
Fish Consumption Advisories	3
Fish Index of Biotic Integrity	*
Qualitative Habitat Evaluation Index	3
Lake Trophic Scores	2
Sediment Potential	4

Note:

The UWA scores range from one to five, with a score of one indicating good water quality and a score of five indicating severe impairment.

Indiana's 2000-2001 Unified Watershed Assessment (UWA)

During summer 1999 the UWA workgroup used additional layers of information to identify the **resource concerns and stressors** for each of the 361 11-digit watersheds in Indiana. Examination of the human activities that have the potential to impact the ecosystem will help planners to focus on those areas where restoration may be most critical. Organizations can identify opportunities to use their programs and resources to address those areas.

This focusing process will illuminate areas where the interests of two or more partner agencies may converge. It is intended that this will lead to more effective allocation of resources for restoration and protection activities. At the local level, this information can assist groups to prioritize watershed activities and provide some discussion points for planning.

This amended assessment has the following benefits:

- ◆ Provides a logical process for targeting funds, which may be expanded or updated without changing the basic framework.
- ◆ Provides information at a finer resolution (11-digit hydrologic units) to agencies and local groups interested in watershed assessment.
- ◆ Identifies data gaps.

- ♦ Can be used as a compliment to other assessments, such as the 305(b) Report and 303(d) List.

Table 2-2 and Figure 2-1 show the results of the 2000-2001 UWA for the St. Joseph-Lake Michigan watershed.

3 Identification of Impaired Waters

Section 303(d) of the Clean Water Act requires states to identify waters that do not or are not expected to meet applicable water quality standards with federal technology based standards alone. States are also required to develop a priority ranking for these waters taking into account the severity of the pollution and the designated uses of the waters. Indiana's 303(d) list was approved by EPA on February 16, 1999.

Once the Section 303(d) list and ranking of waters is completed, the states are required to develop Total Maximum Daily Loads (TMDLs) for these waters in order to achieve compliance with the water quality standards. The TMDL is an allocation that determines the point and nonpoint source (plus margin of safety) load reductions required in order for the waterbody to meet water quality standards. IDEM=s Office of Water Quality has and continues to perform point source waste load allocations for receiving waters. Part I of the WRAS briefly outlines IDEM=s strategy for developing TMDLs.

The following St. Joseph-Lake Michigan Watershed waterbodies are on Indiana=s 1998 Clean Water Act Section 303(d) list submitted and approved by EPA 303(d) list (Figure 3-1):

Crawford Ditch/Elkhart County:	Copper, Oil
Elkhart River/Elkhart County:	Fish Consumption Advisory(FCA) for polychlorinated byphenols (PCB) and mercury; E. coli
Jimmerson Lake/Steuben County:	FCA for mercury
Juday Creek/St. Joseph County:	FCA for PCBs
Lake James/Steuben County:	FCA for mercury
Lake Shipshewana/Lagrange County:	FCA for mercury
Lake Waubee/Kosciusko County:	FCA for mercury
Lake Wawasee/Kosciusko County:	FCA for PCBs & mercury
Long Lake/Steuben County:	FCA for mercury
Marsh Lake/Steuben County:	FCA for mercury
Mather's Ditch/Elkhart County:	Low dissolved oxygen & Endrin
Olin Lake/LaGrange County:	FCA for mercury
Oliver Lake/LaGrange County :	FCA for mercury
Orland Tributary/Steuben County:	Low dissolved oxygen
Pigeon Creek/Steuben County:	FCA for PCBs & mercury
Snow Lake/Steuben County:	FCA for PCBs & mercury
St. Joseph River/Elkhart & St. Joseph County:	FCA for PCBs & mercury ; E. coli

**FCA Fish Consumption Advisory
PCBs polychlorinated byphenols

4 Priority Issues and Recommended Management Strategies

Part I provided the existing water quality information for the St. Joseph-Lake Michigan watershed and Part II lists priority issues and concerns from local, state, and federal stakeholders in the watershed. This section pulls together the priority issues and concerns held by all stakeholders and recommends management strategies. Underlying all discussions of priority issues and concerns is the fact that improving water quality in the St. Joseph-Lake Michigan Watershed will also enhance the natural and recreational values of St. Joseph-Lake Michigan. Each subsection below focuses on a single priority issue.

4.1 Data\Information and Targeting

Stakeholder groups identified a need for more water quality data and information in order to prioritize and target specific areas of the St. Joseph-Lake Michigan watershed. In addition to targeting areas, stakeholders identified the need for more data and information about the actual impact on water quality from nonpoint sources. Success in restoring water quality in the St. Joseph-Lake Michigan Watershed is fundamentally based on identifying the specific geographic problem areas; identifying all sources contributing to the impairment of the waterbody; and quantifying the contribution of a pollutant by each source.

Recommended Management Strategy 1: The local soil and water conservation districts in this watershed have worked together and applied for and received an IDEM 319 grant. This grant will allow for sampling and monitoring of water quality data in an effort to better understand the impact of nonpoint sources.

Recommended Management Strategy 2: Through the development of Total Maximum Daily Loads (TMDLs) for impaired waterbodies in the St. Joseph-Lake Michigan watershed, all sources contributing to the impairment of a waterbody will be identified and quantified in terms of their contribution to the waterbody. This includes gathering more data and information on nonpoint sources of water pollution. Throughout the TMDL process, information and feedback from watershed stakeholders will be required in order to generate appropriate allocation scenarios. The result of developing TMDLs will be an understanding of the impact of nonpoint sources on water quality in the watershed.

Recommended Management Strategy 3: As discussed in Part I, there has been little coordination between individual volunteer water quality monitoring groups within the St. Joseph-Lake Michigan watershed. In addition, a database that would hold the volunteer water quality monitoring data for the St. Joseph-Lake Michigan Watershed does not exist. Michigan's Water Quality Program sponsored by the Department of Environmental Quality, and the Lake Michigan Tributary Monitoring Program, sponsored by U.S. EPA Region 5, are being coordinated through the Friends of the St. Joe River Association, Inc. The information gathered will be located on their web page.

In Indiana several groups are working on water quality data collection. John Rouch, through IDEM 319 grants, is working to develop a database accessible to anyone with interest in the St. Joseph-Lake Michigan watershed. Both the Indiana and Michigan database will be compatible.

4.2 Streambank Erosion and Stabilization

The cutting and erosion of streambanks within the St. Joseph-Lake Michigan Watershed was identified by many local, state, and federal stakeholders as a major concern. This cutting and erosion increases the sediment load in waterbodies and directly impacts the scenic and recreational values of waterbodies in the St. Joseph-Lake Michigan watershed. Streambank cutting and erosion is often a function of many factors that include stream energy and velocity, flooding, and land management. Increased drainage in headwater streams and ditches increases stream energies during rainfall events and often leads to increased streambank cutting and erosion downstream. Hence, this problem is not easily solved.

Recommended Management Strategy: IDEM's Office of Water Quality offers their active support to the primary agency that has jurisdiction over this problem in order to facilitate the development of solutions..

Structural stabilization of specific streambank areas in the St. Joseph-Lake Michigan Watershed may solve problems on a temporary basis. However, a comprehensive understanding of drainage, stream flows and energies, and land management practices is required to adequately approach this problem. Conservation partners (local, state, and federal) are actively working within their specific geographic areas (typically at the county level); however, this may not facilitate solving the streambank cutting and erosion problems because efforts may not be coordinated between headwater and downstream areas.

4.3 Failing Septic Systems and Straight Pipe Discharges

Local county health departments and other stakeholders have identified failing septic systems and straight pipe discharge from septic tanks as significant sources of water pollution in the St. Joseph-Lake Michigan watershed. Straight pipe discharges from septic tanks and septic tanks connected to drainage tiles are illegal (327 IAC 5-1-1.5); however, these practices are ongoing in the St. Joseph-Lake Michigan watershed.

Recommended Management Strategy: To further educational efforts, the direct impact of communities discharging their septic tank effluent to waterbodies needs to be adequately characterized. This will involve coordination between the Office of Water Quality, local health departments, Indiana State Department of Health, and other stakeholders. The option of choice to eliminate the illegal discharges will be a cooperative effort between homeowners and local, state, and federal stakeholders. If a cooperative solution can not be reached, illegal dischargers will be required to cease discharge until they obtain an appropriate NPDES permit.

4.4 Water Quality - General

The Clean Water Act Section 303(d) list presented in Section 3 lists water quality limited waterbodies for the St. Joseph-Lake Michigan watershed

Recommended Management Strategy: The Clean Water Act requires states to complete TMDLs for waterbodies listed on the Section 303(d) list. The Office of Water Quality is currently evaluating and exploring the modeling process and data needs required to complete TMDLs for the Section 303(d) listed waterbodies. Completion of a TMDL will involve loading allocations of a pollutant to both point and nonpoint sources. The TMDL development process is in its early

stages for the St. Joseph-Lake Michigan watershed. This will involve meetings with stakeholder groups linked to the Section 303(d) waterbodies. As TMDLs are developed, this Watershed Restoration Action Strategy will be amended to incorporate the final TMDLs.

4.5 Fish Consumption Advisories

As noted in Part I and Part II, fish consumption advisories are clearly major concerns and priority issues within the St. Joseph-Lake Michigan watershed.

Recommended Management Strategy 1: The St. Joseph-Lake Michigan fish consumption advisories are related to PCB contamination and mercury. Continued monitoring will give a better assessment of these problems and corrective actions that may be taken. Also, development of TMDLs, as addressed in Section 4.4, will be a primary strategy.

4.6 Nonpoint Source Pollution - General

Nonpoint source pollution contributions are often difficult to assess or quantify. Currently, loadings of nonpoint source pollutants to water are often inferred by examination of land use practices, without actual measurements. In addition, the actual water quality impairments related to nonpoint source pollutants have not been well characterized in the St. Joseph-Lake Michigan watershed. Finally, very few regulatory control mechanisms exist to control nonpoint source pollution.

Recommended Management Strategy 1: Through the TMDL development process, the Office of Water Quality will identify, assess, and quantify nonpoint source pollutant loadings to impaired waterbodies. In order to accomplish this task, the Office of Water Quality will work closely with local, state, and federal stakeholders at the watershed and subwatershed level. Loading scenarios for nonpoint source pollutants will be developed by the Office of Water Quality and reviewed by local, state, and federal stakeholders. Implementation of nonpoint source controls will involve a blend of funding assistance and regulatory action, where applicable.

Recommended Management Strategy 2: Numerous funding mechanisms, such as Conservation Reserve Program, Environmental Quality Incentive Program, Lake and River Enhancement program, and 319(h) grants, exist to promote practices to reduce nonpoint source pollution in the watershed. In addition, to effectively address nonpoint source pollution in the watershed, the prioritization and targeting discussed previously in Part II should be used to allocate further application of resources.

Recommended Management Strategy 3: The St. Joseph-Lake Michigan Watershed has high livestock inventories. Although not shown in Part I due to disclosure problems, this watershed has counties that rank in the top ten counties in Indiana for poultry. Indiana (due to some of the counties in this watershed) ranks in the top five states in the U.S. for poultry production. Most of the watershed is in agricultural production (84%, see Part 1 - section 2.2.1). In an effort to better understand the impact of livestock and waste management and crop production management practices, the local soil and water conservation districts are working with IDEM through 319 grants to identify concerns and work with agricultural producers to address these concerns.

4.7 Point Sources - General

Illegal point source discharges, such as tiles discharging septic tank effluent, exist in the watershed.

Recommended Management Strategy: The Permitting and Compliance Branch of the Office of Water Quality is responsible for issuing and monitoring compliance of NPDES permit holders. Clearly, more emphasis and resources are needed to identify and correct illegal point sources and non-complying point sources. Improving compliance of NPDES dischargers and identifying illegal dischargers will involve fostering a working relationship with other local, state, and federal stakeholders to monitor compliance and report unusual discharges or stream appearance. In regards to illegal discharges, the Office of Water Quality will work with local, state, and federal stakeholders to identify and eliminate these sources of water pollution.

5 Future Expectations and Actions

As discussed in Part I, this Watershed Restoration Action Strategy is intended to be fluid document that will be revised or amended as new information becomes available. Section 5.1 discusses expectations derived from the Strategy and how progress will be measured. Specific revisions and amendments to the Watershed Restoration Action Strategy are discussed in Section 5.2. Finally, the Watershed Restoration Action Strategy will be reviewed by all stakeholders before it becomes final, as described in Section 5.3.

5.1 Expectations and Measuring Progress

The St. Joseph-Lake Michigan Strategy provides a starting point to address water quality concerns held by local, state, and federal stakeholders. Part II provides recommended management strategies to address these concerns. Through cooperative efforts with stakeholders, all of the recommended management strategies listed will begin implementation by the summer of 2000.

Measurement of progress is critical to the success of any plan. Water quality improvements will not take place overnight. Measuring of progress in terms of water quality will be provided through the Office of Water Quality Assessment Branch's rotating basin monitoring strategy. This will allow an assessment of progress in improving water quality.

5.2 Expected Revisions and Amendments

This Watershed Restoration Action Strategy is intended to provide a starting point to improve water quality and measure the improvement. Hence, this document will require revisions and amendments as new information becomes available. The future revisions and amendments have been divided into those that are expected within the next year (Section 5.2.1) and those that will occur over a long-term basis (Section 5.2.2).

5.2.1 Short Term Revisions and Amendments

The most significant revisions and amendments will likely occur during 2001 and after, as a result of the rotating basin assessments to be completed during 2001. The Section 305(b) assessments will be completed by late 1999 or early 2000. Local, state, and federal stakeholder comments regarding the Watershed Restoration Action Strategy will be addressed in future revisions of the document.

5.2.2 Long Term Revisions and Amendments

The Office of Water Quality is moving toward adopting a watershed management approach to solve water quality problems. Part of the watershed approach is the use of a rotating basin management cycle. The Assessment Branch of the Office of Water Quality has already adopted this rotating basin cycle in its intensive monitoring and assessment of Indiana waterbodies (this is in addition to the already established fixed monitoring station monitoring which occurs on a monthly basis). Based on the cycle the Assessment Branch is using, the next intensive monitoring of the St. Joseph-Lake Michigan watershed will occur during the sampling season of

2001. The information from the 2001 monitoring effort will be incorporated into the Watershed Restoration Action Strategy.

In addition, the Watershed Restoration Action Strategy may be revised or amended prior to 2001, if sufficient information becomes available.

5.3 Review of the Watershed Restoration Action Strategy

Before this Watershed Restoration Action Strategy becomes final, it will undergo rigorous review. The first stage of review will be performed internally by the Office of Water Quality. Once the Watershed Restoration Action Strategy has been revised to address internal Office of Water Quality comments, it will be circulated to local, state, and federal stakeholders in the watershed and meetings within the watershed will be held to discuss the document. Written comments from local, state, and federal stakeholders will be addressed and the Watershed Restoration Action Strategy will again be revised to incorporate applicable comments. Once internal and external comments have been addressed, the final version of the Watershed Restoration Action Strategy will be released.

TABLE 2-2

HYDROLOGIC UNIT SCORES for Each Parameter Used in the Unified Watershed Assessment [2000-2001]																
11 Digit Hydrologic Unit		Mussel Diversity and Occurrence	Aquatic Life Use Support	Recreational Use Attainment	Stream Fishery	Lake Fishery	Eurasian Milfoil Infestation Status	Lake Trophic Status	Critical Biodiversity Resource	Aquifer Vulnerability	Population Using Surface Water for Drinking Water	Residential Septic System Density	Degree of Urbanization	Density of Livestock	% Cropland	Mineral Extraction Activities
St Joe LM	04050001020	3	nd	nd	nd	nd	nd	nd	1	5	1	4	1	2	2	1
	04050001080	nd	nd	nd	nd	5	nd	3	2	1	1	4	2	2	2	1
	04050001090	nd	nd	nd	nd	nd	nd	nd	5	2	1	5	2	4	3	1
	04050001100	nd	nd	nd	nd	1	2	2	5	1	1	4	2	5	3	1
	04050001110	nd	nd	nd	4	nd	nd	nd	5	3	1	4	2	4	3	1
	04050001120	nd	nd	nd	2	5	nd	3	5	2	1	4	2	5	4	1
	04050001130	nd	nd	nd	nd	nd	nd	nd	3	1	1	5	2	5	3	1
	04050001140	nd	nd	nd	nd	2	3	4	4	2	1	4	2	5	3	1
	04050001150	nd	nd	nd	nd	5	nd	nd	4	1	1	5	2	5	3	1
	04050001160	nd	nd	nd	3	nd	nd	2	2	1	1	5	3	5	3	1
	04050001170	nd	nd	nd	3	nd	nd	nd	5	3	1	4	2	5	3	1
	04050001180	nd	nd	nd	5	3	2	4	5	4	1	3	2	3	3	1
	04050001190	nd	nd	nd	1	4	nd	nd	3	2	1	4	2	4	3	1
	04050001200	nd	nd	nd	nd	3	3	3	4	3	1	4	2	4	3	1
	04050001210	nd	nd	nd	2	nd	nd	nd	2	2	1	5	2	5	3	1
	04050001220	nd	nd	nd	nd	nd	nd	3	2	1	1	5	3	5	3	1
	04050001230	nd	nd	nd	nd	nd	nd	nd	2	4	1	5	2	5	3	1
	04050001240	nd	nd	nd	nd	nd	nd	2	4	1	1	5	3	3	2	1
	04050001280	nd	nd	nd	nd	nd	nd	2	2	2	1	5	nd	3	2	1

